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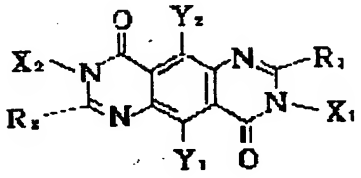
(54) ORGANIC ELECTROLUMINESCENCE ELEMENT

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an organic electroluminescence element which is excellent in light emitting efficiency and emits the light with high luminance by sandwiching at least a single layer of a light emitting layer containing at least one kind of a pyrimid [4,5-g]quinazoline-4,9-dione derivative between a pair of electrodes.
SOLUTION: A pyrimid[4,5-g]quinazoline-4,9-dione derivative used here is desirably a compound expressed by a formula. In the formula, R1 and R2 represent a straight chain, branch or ring alkyl group or a substitutional or nonsubstitutional aryl group, and X1 and X2 represent a hydrogen atom, a straight chain, branch or ring alkyl group or a substitutional or nonsubstitutional aryl group, and Y1 and Y2 represent a hydrogen atom, a halogen atom or a straight chain, branch or ring alkyl group and a straight chain, branch or ring alkoxy group. Therefore, an organic electroluminescence element excellent in light emitting luminance can be provided.



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CLAIMS

[Claim(s)]
[Claim 1] To inter-electrode [of a couple], it is pyrimide [4 and 5-g]. Organic electroluminescence devices which come to pinch the layer containing quinazoline -4 and at least one sort of 9-dione derivatives further at least.
[Claim 2] Pyrimide [4 and 5-g] Quinazoline -4, organic electroluminescence devices according to claim 1 whose layer containing 9-dione derivative is a luminous layer.
[Claim 3] Pyrimide [4 and 5-g] Quinazoline -4, organic electroluminescence devices according to claim 1 whose layer containing 9-dione derivative is an electron-injection transporting bed.
[Claim 4] Pyrimide [4 and 5-g] Quinazoline -4, organic electroluminescence devices according to claim 1 to 3 characterized by the layer containing 9-dione derivative containing a luminescent organometallic complex.
[Claim 5] Organic electroluminescence devices according to claim 1 to 4 which have a hole-injection transporting bed further in inter-electrode [of a couple].
[Claim 6] Organic electroluminescence devices according to claim 1 to 5 which have an electron-injection transporting bed further in inter-electrode [of a couple].

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to organic electroluminescence devices.
[0002]
[Description of the Prior Art] Conventionally, although inorganic electroluminescence devices have been used as the panel type light sources, such as a back light, in order to make this light emitting device drive, the high voltage of an alternating current is required for them. Recently came and the organic electroluminescence devices (organic electroluminescent element : organic EL element) which used the organic material for luminescent material were developed [Appl.Phys.Lett., 51, and 913 (1987)]. Organic electroluminescence devices are elements which emit light using the light which has the structure pinched between an anode plate and cathode in the thin film containing a fluorescence nature organic compound, pours an electron and an electron hole (hole) into this thin film, and is emitted in case an exciton (exciton) is made to generate and this exciton deactivates by making it recombine. organic electroluminescence devices -- severalV- dozens -- it is the low battery of about V direct current, and luminescence of various colors (for example, red, blue, green) is possible by being able to emit light and choosing the kind of fluorescence nature organic compound The application to a light emitting device various in the organic electroluminescence devices which have such a feature, a display device, etc. is expected. However, generally, luminescence brightness is low and is not enough practically.
[0003] As a method of raising luminescence brightness, the organic electroluminescence devices which used for example, tris (8-quinolinolato) aluminum as a luminous layer, and used the host compound, the coumarin derivative, and the pyran derivative as a guest compound (dopant) are proposed [J.Appl.Phys., 65, and 3610 (1989)]. Moreover, organic electroluminescence devices were using screw (2-methyl-8-quinolinolato) (4-phenyl phenolate) aluminum as a luminous layer, and using the host compound and the acridone derivative (for example, N-methyl-2-methoxy acridone) as a guest compound are proposed (JP,8-67873,A). However, these light emitting devices are also hard to be referred to as having sufficient luminescence brightness. moreover, the organic electroluminescence devices which used the acridone derivative (for example, N-methyl-2-methoxy acridone) for the electron-injection transporting bed are proposed -- **** (JP,8-67873,A) -- the adhesion of the layer and electrode (for example, cathode) containing an acridone derivative was scarce, and the being improved made it clear on the occasion of prolonged use Now, organic electroluminescence devices which emit light in high brightness further are desired.
[0004]
[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the organic electroluminescence devices which are excellent in luminous efficiency and emit light in high brightness.
[0005]
[Means for Solving the Problem] this invention person etc. came to complete this invention, as a result of examining organic electroluminescence devices wholeheartedly. That is, this invention is pyrimide [4 and 5-g] to inter-electrode [of ** couple]. The layer containing quinazoline -4 and at least one sort of 9-dione derivatives Organic electroluminescence devices and ** pyrimide [4 and 5-

g] which it comes to pinch further at least Quinazoline -4, organic electroluminescence devices given in ** the given layer containing 9-dione derivative is a luminous layer, ** Pyrimide [4 and 5-g] Quinazoline -4, organic electroluminescence devices given in ** the given layer containing 9-dione derivative is an electron-injection transporting bed, ** Pyrimide [4 and 5-g] The layer containing quinazoline -4 and 9-dione derivative Organic electroluminescence devices given in either the aforementioned ** characterized by containing a luminescent organometallic complex - **, ** It is further related with inter-electrode [of organic electroluminescence devices given in either the aforementioned ** which has a hole-injection transporting bed - **, and ** couple] at organic electroluminescence devices given in either the aforementioned ** which has an electron-injection transporting bed - ** inter-electrode [of a couple].

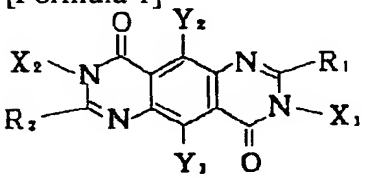
[0006]

[Embodiments of the Invention] Hereafter, this invention is explained in detail.

[0007] The organic electroluminescence devices of this invention are pyrimide [4 and 5-g] to inter-electrode [of a couple]. It comes to pinch the layer containing quinazoline -4 and at least one sort of 9-dione derivatives further at least. Pyrimide used by this invention [4 and 5-g] As quinazoline -4 and a 9-dione derivative (it is hereafter written as the compound A concerning this invention) Preferably, it is pyrimide [4 and 5-g]. It is the compound which has the substituent in the 2nd place, quinazoline -4 and 9-dione skeleton, and the 7th place. more preferably 2 which has an alkyl group or an aryl group in the 2nd place and the 7th place, and 7-JI substitution pyrimide [4 and 5-g] It is quinazoline -4 and 9-dione derivative, and is the compound especially expressed with a general formula (1) and (** 1) preferably.

[0008]

[Formula 1]



(1)

(R1 and R2 express among a formula the aryl group which is not replaced [a straight chain, branching, an annular alkyl group, substitution, or], respectively, X1 and X2 express the aryl group which is not replaced [a hydrogen atom, a straight chain, branching, an annular alkyl group, substitution, or], respectively, and Y1 and Y2 express a hydrogen atom, a halogen atom or a straight chain, branching or an annular alkyl group, a straight chain, branching, or an annular alkoxy group, respectively)

[0009] It sets to a general formula (1) and is R1. And R2 The aryl group which is not replaced [a straight chain, branching, an annular alkyl group, substitution, or] is expressed, respectively. preferably It is the heterocycle formula aromatic machine which is not replaced [the ring formula aromatic machine which is not replaced / a straight chain, branching or an annular alkyl group, substitution, or /, substitution, or]. more preferably They are the straight chain of carbon numbers 1-10, branching, an annular alkyl group, a ring formula aromatic machine with 6-30 total carbons, or a heterocycle formula aromatic machine with 3-30 total carbons.

[0010] R1 And R2 The aryl group may have the substituent. For example, the alkyl group of carbon numbers 1-20, the alkenyl machine of carbon numbers 2-20, The aralkyl machine of carbon numbers 7-20, the aryl group of carbon numbers 6-20, the alkoxy group of carbon numbers 1-20, The alkoxyalkyl group of carbon numbers 2-20, the alkoxy alkyloxy machine of carbon numbers 2-20, The alkenyloxy machine of carbon numbers 2-20, the alkenyloxy alkyl group of carbon numbers 3-20, The alkenyloxy alkyloxy machine of carbon numbers 3-20, the aralkyloxy machine of carbon numbers 7-20, The aralkyloxy alkyl group of carbon numbers 8-20, the aralkyloxy alkyloxy machine of carbon numbers 8-20, The aryloxy group of carbon numbers 6-20, the aryloxy alkyl group of carbon numbers 7-20, The aryloxy alkyloxy machine of carbon numbers 7-20, the alkyl carbonyl group of carbon numbers 2-20, The alkenyl carbonyl group of carbon numbers 3-20, the aralkyl carbonyl group of carbon numbers 8-20, The aryl carbonyl group of carbon numbers 7-20, the alkyloxy carbonyl group of carbon numbers 2-20, The alkenyloxy carbonyl group of carbon numbers

3-20, the aralkyloxy carbonyl group of carbon numbers 8-20, The aryloxy carbonyl group of carbon numbers 7-20, the alkylcarbonyloxy machine of carbon numbers 2-20, The alkenyl carbonyloxy group of carbon numbers 3-20, the aralkyl carbonyloxy group of carbon numbers 8-20, The aryl-carbonyloxy group of carbon numbers 7-20, the aralkyloxy aralkyl machine of carbon numbers 14-20, The alkyl thio machine of carbon numbers 1-20, the aralkyl thio machine of carbon numbers 7-20, The aryl thio machine of carbon numbers 6-20, the annular alkyl group of hetero atom content of a carbon number 4-20, substituents, such as a halogen atom, a trifluoromethyl machine, a hydroxyl group, the amino group, N-substitution amino group of carbon numbers 1-20, carbon numbers 2-40N, N-JI substitution amino group, a nitro group, a cyano group, and a formyl machine, -- single substitution -- or it may be many replaced

[0011] Furthermore, the aryl group contained in these substituents may be replaced by the alkyl group of carbon numbers 1-10, the alkoxy group of carbon numbers 1-10, the alkyl thio machine of carbon numbers 1-10, the aralkyl machine of carbon numbers 7-10, the aralkyloxy machine of carbon numbers 7-10, the hydroxyl group, the halogen atom, etc. Especially desirable R1 And R2, respectively The alkyl group of carbon numbers 1-10, As a substituent, or the alkyl group of carbon numbers 1-10, the alkoxy group of carbon numbers 1-10, They are single substitution, a ring formula aromatic machine with 6-20 total carbons which may be many replaced, or a heterocycle formula aromatic machine with 3-20 total carbons in the aryl group of carbon numbers 6-10, the aryloxy group of carbon numbers 6-10, a halogen atom, and a trifluoromethyl machine.

[0012] R1 And R2 As an example, for example A methyl group, an ethyl group, n-propyl group, an isopropyl machine, n-butyl, an isobutyl machine, a tert-butyl, n-pentyl machine, an isopentyl machine, a neopentyl machine, a tert-pentyl machine, Alkyl groups, such as n-hexyl machine, a cyclohexyl machine, n-heptyl machine, a cyclohexyl methyl group, n-octyl machine, a tert-octyl machine, a 2-ethylhexyl machine, n-nonyl machine, and n-decyl group, [0013] For example, a phenyl group, 1-naphthyl group, 2-naphthyl group, 2-anthryl machine, 9-anthryl machine, 3-furil machine, 2-furil machine, 3-thienyl group, 2-thienyl group, 3-pyrrolyl machine, 2-oxazolyl machine, 2-thiazolyl machine, 2-thiazolyl machine, 2-oxazolyl machine, a 4-iso oxazolyl machine, 2-thiazolyl machine, a 4-iso thiazolyl machine, 4-pyrazolyl machine, 4-imidazolyl machine, 2-imidazolyl machine, 4-pyridyl machine, 3-pyridyl machine, 2-pyridyl machine, 5-pyrimidyl machine, 2-pyrimidyl machine, a 2-pyrazinyl machine, 4-pilus DAJINIRU machine, 3-OKISAJINIRU machine, 2-thia JINIRU machine, a 3-benzofuranyl machine, a 2-benzofuranyl machine, A 3-benzo thienyl group, a 2-benzo thienyl group, 2-benzoxazolyl machine, 2-benzothiazolyl machine, a 2-benzo imidazolyl machine, 3-indolyl machine, 4-quinolinyl group, 3-KINORINI machine, 4-isoquinolinyl group, 4-cinchona bark ZORINIRU machine, 2-kino KISARINIRU machine, 6-phthalazinyl machine, 3-bear RINIRU machine, 3-carbazolyl machine, 2-FENAJINIRU machine, [0014] 4-methylphenyl machine, 3-methylphenyl machine, 2-methylphenyl machine, 4-ethyl phenyl group, 3-ethyl phenyl group, 2-ethyl phenyl group, A 4-n-propyl phenyl group, 4-isopropyl phenyl group, 2-isopropyl phenyl group, A 4-n-butylphenyl group, 4-isobutyl phenyl group, a 4-sec-butylphenyl group, A 2-sec-butylphenyl group, a 4-tert-butylphenyl group, A 3-tert-butylphenyl group, a 2-tert-butylphenyl group, A 4-n-pentyl phenyl group, 4-isopentyl phenyl group, 2-isopentyl phenyl group, A 2-neopentyl phenyl group, a 4-tert-pentyl phenyl group, A 2-tert-pentyl phenyl group, a 4-n-hexyl phenyl group, A 4-n-heptyl phenyl group, a 4-n-octyl phenyl group, 4-(2'-ethylhexyl) phenyl group,